



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/826,319	04/19/2004	Tetsuo Aoyama	060937-0186-US	1070
9629	7590	08/21/2007		
MORGAN LEWIS & BOCKIUS LLP 1111 PENNSYLVANIA AVENUE NW WASHINGTON, DC 20004			EXAMINER CHAUDHRY, SAEED T	
			ART UNIT	PAPER NUMBER
			1746	
			MAIL DATE	DELIVERY MODE
			08/21/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/826,319

Applicant(s)

AOYAMA ET AL.

Examiner

Saeed T. Chaudhry

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 June 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) 1-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 26-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

Art Unit: 1746

DETAILED ACTION

Applicant's amendments and remarks filed June 12, 2007 have been acknowledged by the examiner and entered. Claims 1-33 are pending in this application. Of the above 1-25 has been withdrawn from consideration

Claim Rejections - 35 USC § 112

Claims 26-27 and 32-33 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 26, recite a limitation "residue remover is free of chelators" and claim 32, recite a limitation "remover is free of chelating agents", which do not have support in the specification.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 148 USPQ 459, that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or unobviousness.

Claims 28-31 are rejected under 35 U.S.C. § 103(a) as being unpatentable over

Gotoh et al in view of Park et al and Hada et al.

Gotoh et al (6,514,352) disclose a method for cleaning plasma ashed residue from the surface of semiconductors by contacting the semiconductor with oxidizing agent from 0.0001 to 60% by weight; an acid in the range of 0.01 to 10% such as diethylene triamine penta methylenephosphonic acid; ammonium fluoride from 0.001 to 20% by weight; organic solvent from 1 to 70% by weight such as N, N-dimethylacetamide and diethylene glycol monobutyl ether and balance water. After cleaning rinsing with ultrapure water and dried steps are performed. The cleaning solution pH shall not specifically be restricted and it is usually used in a range of pH 3 to pH 12. The cleaning solution temperature falls in the range of room temperature to 80 C (see col. 3, line 46 to col. 5, line 49 and claims).

The claimed process utilizes comprising language. Therefore, it does not restrict any other components and read on the Gotoh et al process of cleaning and removing the residue from the semiconductor surface. Gotoh et al disclose semiconductor having copper metal thereon. Therefore, semiconductor inherently have 0.002 dielectric constant.

Gotoh et al disclose that the cleaning agent used in the present invention may be blended, if necessary, with additives which have so far been used for a resist peeling solution as long as the object of the present invention is not damaged (see col. 5, lines 29-32). Gotoh et al reference fails to disclose 0.2 to 5% by weight of an alkanolamine in the cleaning solution.

Park et al (6,508,887) discloses a method of removing resist residue by contacting with a solution of an alkoxy N-hydroxyalkyl alkanamide; alkanolamine and a fluoride based reducing agent.

Hada et al (5,911,836) disclose a method of producing a semiconductor device, which includes applying a conductive metal film on a semiconductor wafer, applying a photoresist on

Art Unit: 1746

the conductive metal film, removing the photoresist with a removing agent containing a fluorine compound or at least one basic component selected from the group consisting of a quaternary ammonium hydroxide, an alkanolamine and a mixture of an alkanolamine and a reducing agent, and cleaning the resultant semiconductor device by rinsing with a rinse comprising water and at least one peroxide compound (see abstract).

It would have been obvious at the time applicant invented the claimed process to incorporate the cited alkanolamine as disclosed by Park et al and Hada et al into the process of Gotoh et al for purpose of removing and cleaning resist residue from the surface of the substrate because all the references are removing resist residue. It is well known in the art to combine the composition which are known for the same purpose to increase the efficiency. It would have been obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose in order to form a third composition which is to be used for the very same purpose (see In re Kerkhoven 205 USPQ 1069 or In re Crockett 126 USPQ 186, 188 (1960) or In re Lindner 173 USPQ 356, 357).

Further, Alkanolamine is well known in the art for removing resist residue but increase the corrosion effect on the metal surface. Gotoh et al disclose that the cleaning agent used in the present invention may be blended, if necessary with additives which have so far been used for a resist peeling solution as long as the object of the present invention is not damaged. Therefore, one of ordinary skill in the art would expect that very low percentage such as 0.2 to 5% would not effect corrosion on the metal surface and with routine experimentation would find the best percentage in the composition. Further, it is well known in the art to manipulate the percentage of the composition for better and efficient results. It has been held obvious that if any minor optimization are necessary to meet the instant claim limitations, optimization of relative

Art Unit: 1746

proportions and operating conditions are within the discretion of the skilled artisan (see *In Aller et al.* 105 USPQ 233, 42 CCPA 824). The references does not specifically teach the particular ranges presently claimed, although overlapping values are taught in the section cited above. However, no criticality has been shown for the presently claimed ranges over the closest prior art, and optimization of results would have been obvious to one skilled in the art. See *In re Budd*, 138 USPQ 71, 73, 73 (CCPA 1963). Overlapping ranges may establish prima facie obviousness. See *in re Malagari*, 182 USPQ 549, 553 (CCPA 1974) (J. Rich). Gotoh et al disclose semiconductor having copper metal thereon. Therefore, semiconductor inherently have 0.002 dielectric constant. Further, Gotoh et al disclose derivatives of phosphonic acid and sulfamic acid in the cleaning solution. Therefore one of ordinary skill in the art would use acids rather than datives, since acids are within the same specie.

Response to Applicant's Arguments

Applicant argued that Gotoh, Park and Hada fail to disclose sulfamic acid or phosphonic acid.

This argument is not persuasive because Gotoh et al disclose derivatives of phosphonic acid and sulfamic acid as chelating agents in the cleaning solution. Therefore one of ordinary skill in the art would use acids rather than datives, since acids are within the same specie. Further, phosphonic acids are chelating agents, which are disclosed by Gotoh et al.

Applicant's arguments filed June 1, 2007 have been fully considered but they are not persuasive.

Applicant's amendment necessitated the new grounds of rejection. Accordingly, THIS ACTION IS MADE FINAL. See M.P.E.P. § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 C.F.R. § 1.136(a).

Art Unit: 1746

A SHORTENED STATUTORY PERIOD FOR RESPONSE TO THIS FINAL ACTION IS SET TO EXPIRE THREE MONTHS FROM THE DATE OF THIS ACTION. IN THE EVENT A FIRST RESPONSE IS FILED WITHIN TWO MONTHS OF THE MAILING DATE OF THIS FINAL ACTION AND THE ADVISORY ACTION IS NOT MAILED UNTIL AFTER THE END OF THE THREE-MONTH SHORTENED STATUTORY PERIOD, THEN THE SHORTENED STATUTORY PERIOD WILL EXPIRE ON THE DATE THE ADVISORY ACTION IS MAILED, AND ANY EXTENSION FEE PURSUANT TO 37 C.F.R. § 1.136(a) WILL BE CALCULATED FROM THE MAILING DATE OF THE ADVISORY ACTION. IN NO EVENT WILL THE STATUTORY PERIOD FOR RESPONSE EXPIRE LATER THAN SIX MONTHS FROM THE DATE OF THIS FINAL ACTION.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Saeed T. Chaudhry whose telephone number is (571) 272-1298. The examiner can normally be reached on Monday-Friday from 9:30 A.M. to 4:00 P.M.

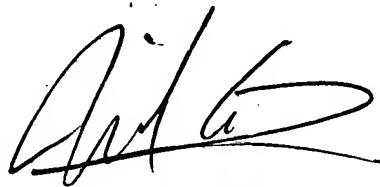
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Michael Barr, can be reached on (571)-272-1414. The fax phone number for non-final is (703)-872-9306.

When filing a FAX in Gp 1700, please indicate in the Header (upper right) "Official" for papers that are to be entered into the file, and "Unofficial" for draft documents and other communication with the PTO that are for entry into the file of the application. This will expedite processing of your papers.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (571) 272-1700.

Saeed T. Chaudhry

Patent Examiner

A handwritten signature in black ink, appearing to read 'Michael Barr', is written over a horizontal line.

**MICHAEL BARR
SUPERVISORY PATENT EXAMINER**